

REMARKS

Introduction

Applicant(s) and applicant's attorney express appreciation to the Examiner for the courtesies extended during the recent interview held on May 19, 2005. This response includes the substance of the Interview and suggestions by the Examiner. Claim 8 has been canceled, such that claims 1-7 and 9-39 are pending. For the convenience of the Examiner, the issues are discussed in the order raised in the Office Action mailed March 14, 2005. Reconsideration and allowance for the above-identified application are now respectfully requested.

Specification

The specification has been amended to indicate that a parent application has been issued as a U.S. patent.

Claim Objections

Claims 1, 3, 8, 9, and 16 were objected to for several formalities. Claims 1, 3, 8, 9, and 16 have been amended to correct the informalities pointed out in the Office Action. In addition, claim 28 has been amended to correct a similar informality to that pointed out by the Examiner.

Claim Rejections Under 35 USC § 103

The Office Action rejects claims 1-22 and 28-39 under 35 U.S.C. § 103(a) as being unpatentable over Rollins *et al* (WO 95/00906) in view of Major *et al* (U.S. Patent No. 5,157,663). Applicants respectfully traverse this rejection in view of the following remarks. The rejection under 35 U.S.C. § 103(a) should be withdrawn at least for the reasons that *Rollins* in

combination with *Major* does not teach or suggest each and every element of the rejected claims. In addition, such elements missing from these references would not be obvious to one of ordinary skill in the art. Further, the rejection should be withdrawn because there is no motivation to combine *Rollins* with *Major* where *Rollins* expressly teaches away from combination with *Major*.

Rollins discloses a method for improving disk mirroring error recovery in a computer system including an alternate communication path. *See Title*. In *Rollins*, Figure 1 is described in the Background section and describes a hardware configuration such as described in Major. *See Page 3, lines 28-31*. According to the Office Action Figure 1 and the corresponding disclosure of *Rollins* teach determining that the first server has write access to the first storage device and to the second mass storage device (page 7, lines 10-21 and page 8, line 16 – page 9, line 14). *Rollins*, however, does not teach or suggest this element, as well as other elements and acts of other claims, as discussed in further detail below.

Major teaches a method and apparatus for providing a fault-tolerant backup system such that if there is a failure of a primary processing system, a replicated system can take over without interruption. *See Abstract*. This is illustrated in Figure 1, which depicts a primary server and a secondary server. In *Major*, both the primary server and the secondary server have an operating system that is divided into two separate parts: an OS engine and an I/O engine. *See Major Col. 4, lines 39-54*. *Major* teaches that the operating system on both the primary server and the secondary server maintain the same state. When an event occurs on the network, *Major* teaches that the event is received by the I/O engine of the primary server. After receiving the event, the I/O engine of the primary server then converts the event into a message format. Next, the I/O

engine of the primary server communicates the event to the I/O engine of the secondary server.

See Major Col. 4, lines 39-54.

After the primary I/O engine receives the confirmation from the secondary I/O engine, the primary I/O engine gives the message to the primary OS engine while the secondary I/O engine gives the message to the secondary OS engine. At this point, the primary server and the secondary server are acting independently of each other. The respective OS engines place the events in a queue to ensure that the asynchronous events are performed in order on both the primary and secondary server. *See Major Col. 4, lines 39-54.*

Figures 4A, 4B, and 4C of *Major* further illustrate the communications that must occur between the primary server and the secondary server and how an event is placed in an event queue of the primary server and in an event queue of the secondary server. Figure 4B, for example, illustrates that the primary server must wait until the secondary server has accepted an event before the event can be placed in the primary OS engine event queue.

After the events are placed in the separate queues, the events are executed independently. Thus, the primary server has control over when the event in the primary queue is executed and the secondary server has control over when the event in the secondary queue is executed. As illustrated in Figure 4C, the primary server is usually required to receive confirmation from the secondary server that the event has been completed. The system taught by *Major* thus involves multiple communications between the primary server and the secondary server that are related to ensuring that both servers have the same events in their respective queues.

When the system taught by *Major* is extended to multiple servers, the communications that must occur between the multiple servers will become increasingly complex. No event can actually be performed, for instance, by the various servers until all have confirmed that the event

has been received and each server has placed the event in its own event queue. Thus, Major exhibits several drawbacks not encountered by the present invention as set forth in the claims.

“... A claimed invention is unpatentable for obviousness if the differences between it and the prior art “are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.” 35 U.S.C. § 103(a) (2004); *Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966); MPEP 2142. Obviousness is a legal question based on underlying factual determinations including: (1) the scope and content of the prior art, including what that prior art teaches explicitly and inherently; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17-18. It is well established that “every limitation positively recited in a claim must be given effect in order to determine what subject matter that claim defines.” *In re Wilder*, 166 USPQ 545, 548 (CCPA 1970).

In contrast to the systems of Major and Rollins, claim 1 of the present invention has been amended to recite that “the first server has write access to the first mass storage device and to the second mass storage device.” This write access if further clarified by claim 1 as amended, which recites:

using an I/O driver of the first server, executing the write request at the first server to write data to the first mass storage device;

using a mirror engine of the first server, transmitting a copy of the write request to the second server; [and]

executing the copy of the write request at the second server to write the data to the second mass storage device without processing the write request using an I/O driver of the second server.

Thus, according to claim 1 as amended, the first server has write access to both the first mass storage device and the second storage device. Furthermore, this write access permits the first server to initiate execution of the write request at the first mass storage device and at the second mass storage device without using an I/O device of the second server.

As noted above, neither *Rollins* nor *Major* teach or suggest a first server having write access to a first mass storage device and a second mass storage device in this manner. In fact, the discussion of *Rollins* relied upon in the Office Action states that “[i]f a server has been unavailable due to its failure ... it is possible for the non-failing server to remember all the changes made ... and forward the changes to the previously-failed server when it has been restored to operation. The previously-failed server can then update its mass storage system with the changes and make it consistent with the non-failing server.” See page 8, lines 1-15. Thus, the rejection of claim 1 should be withdrawn because neither *Rollins* nor *Major* teach this act of claim 1.

As discussed above, *Major* teaches a back up system where the primary server and the secondary server are separate and distinct. In *Major*, access to the storage mediums is controlled exclusively by the respective operating systems. *Major* further requires that events be placed in a queue by each operating system before the events are performed. Thus for at least these reasons, claim 1 distinguishes from the cited references. The Applicant respectfully requests allowance of claim 1.

Independent claim 9 as amended recites:

determining that the first server has write access to the virtual shared storage node, including write access to the first mass storage device and write access to the second mass storage device . . .

As noted above, Major and Rollins fail to teach or suggest a first server having write access to a first mass storage device and write access to a second mass storage device in this manner. Thus, the Applicant respectfully submits that claim 9 distinguishes from the cited references and is in condition for allowance.

Independent claim 16 as amended recites:

while the first server has write access priority to the portion of the first mass storage device and to the portion of the second mass storage device:

executing the write request at the first server to write data to said portion of the first mass storage device;

using a mirror engine of the first server, transmitting a copy of the write request to the second server so that the data can be written to the second mass storage device . . .

As noted above, Major and Rollins fail to teach or suggest a first server having write access to a first mass storage device and write access to a second mass storage device in this manner. Thus, the Applicant respectfully submits that claim 16 distinguishes from the cited references and is in condition for allowance.

Independent claim 20 as amended recites:

determining when the first server or the second server has write access to both the first mass storage device and the second mass storage device . . .

As noted above, Major and Rollins fail to teach or suggest a first server having write access to a first mass storage device and write access to a second mass storage device in this

manner. Thus, the Applicant respectfully submits that claim 20 distinguishes from the cited references and is in condition for allowance.

Independent claim 28 as amended recites:

the first server has write access to at least a portion of the first mass storage device and at least a portion of the second mass storage device;

using an I/O driver of the first server, executing the write request at the first server to write data to the first mass storage device; . . .

without processing the write request using an I/O driver of the second server, executing the write request at the second server. . .

As noted above, Major and Rollins fail to teach or suggest a first server having write access to a first mass storage device and write access to a second mass storage device in this manner. Thus, the Applicant respectfully submits that claim 28 distinguishes from the cited references and is in condition for allowance. Claims 2-7, 10-15, 17-19, 21-27 and 29-39 depend from the independent claims and are allowable for at least this reason.

Even if *Major* or *Rollins* did disclose every element of the claimed invention, there is no motivation for combining *Major* with *Rollins*. The first requirement is that a showing of a suggestion, teaching, or motivation to combine the prior art references is an “essential evidentiary component of an obviousness holding.” *C.R. Bard, Inc. v. M3 Sys. Inc.*, 157 F.3d 1340, 1352 (Fed. Cir. 1998). This evidence may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved. *See Pro Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996). However, the suggestion more often comes from the teachings of the pertinent references. *See In re Rouffet*, 149 F.3d 1350, 1359 (Fed. Cir. 1998). This showing

must be clear and particular. Broad conclusory statements about the teaching of multiple references, standing alone, are not “evidence.” *See Dembiczak*, 175 F.3d at 1000.

The Office Action combines both an embodiment found in the Background section of *Rollins* (i.e. discussed on pages 6-9 of *Rollins*), with an embodiment found in the Detailed Description section of *Rollins* (i.e. discussed on page 26 of *Rollins*), and also with embodiments disclosed in *Major*. It is quite confusing how these elements of the different embodiments would function and act together to arrive at the Applicants claimed embodiments, and even more confusing to find motivation for combining these elements from the references. Nevertheless, there is no motivation for combining *Rollins* with *Major* at least for the reason that *Rollins* explicitly teaches away from a combination with *Major*.

On Page 3 of *Rollins*, Figure 1 is described by *Rollins* as a hardware configuration for a fault-tolerant computer system 100, such as described in Major. Over pages 3-9 *Rollins* discusses Figure 1 and an embodiment such as *Major*. On page 8, line 16 through page 9 line 14, *Rollins* teaches away from the combination of the *Rollins* embodiments with those such as *Major*. For example, *Rollins* describes embodiments such as *Major* as “very time consuming” and “resource-intensive operation”. *Rollins* states that the resource-intensiveness of the recovery operation of *Major* can cause very substantial performance degradation of the non-failed server in processing network requests. Thus, there is no motivation to combine *Rollins* with *Major* at least for the reason that *Rollins* expressly teaches away from combination with *Major*.

Thus, at least for these reasons the Applicant respectfully requests that the rejection of independent claims 1, 9, 16, 20 and 28 under 35 U.S.C. § 103(a) over *Rollins* and *Major* be withdrawn. Likewise, the Applicant respectfully requests that the rejection of claims 2-8, 10-15,

17-19, 21-22, and 29-39 be withdrawn at least due to their dependency from an allowable independent claim.

The Office Action rejects claims 23-27 under 35 U.S.C. § 103(a) as being unpatentable over *Rollins et al* (WO 95/00906) and *Major et al* (U.S. Patent No. 5,157,663) in view of *Kenley et al.* (U.S. Patent No. 5,276,867). Applicants respectfully traverse this rejection in view of the following remarks. Claims 23-27 are each dependant on independent claim 20. At least for the reasons given above, claim 20 is allowable. Therefore, Applicants respectfully request that the rejection of claims 23-27 under 35 U.S.C. § 103(a) be withdrawn.

The Applicant also points out that several of the claims have been amended to promote clarity, to provide terminology that is consistent with that of the base claims, and for other reasons that are not related to either responding to a rejection of the claims or distinguishing from cited art.

In view of the foregoing, Applicants respectfully submit that claims 1-7 and 8-39 are in condition for allowance. In the event that the Examiner finds remaining impediments to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney.

Dated this 29th day of June, 2005.

Respectfully submitted,



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